



Data Sheet

PLUS+1[®] Controller

MC038-020



Mobile Machine Management

The MC038-020 controller is an element of the flexible, powerful, expandable, and affordable PLUS+1 family of mobile machine management products. This device is a general-purpose controller that is equally suited for use as a member of a distributed machine control system, with intelligence in every node, or as a stand-alone controller.

Product Highlights

The MC038-020 employs a Digital Signal Processor (DSP), providing the controller with extremely fast single cycle processing speed and 256K internal flash. Product functionality includes features that enhance machine control safety including redundant E-stop inputs and one 20A digital output with redundant hardware shutdown paths. Other product features include two 19A PWM outputs and a dedicated sleep mode input.

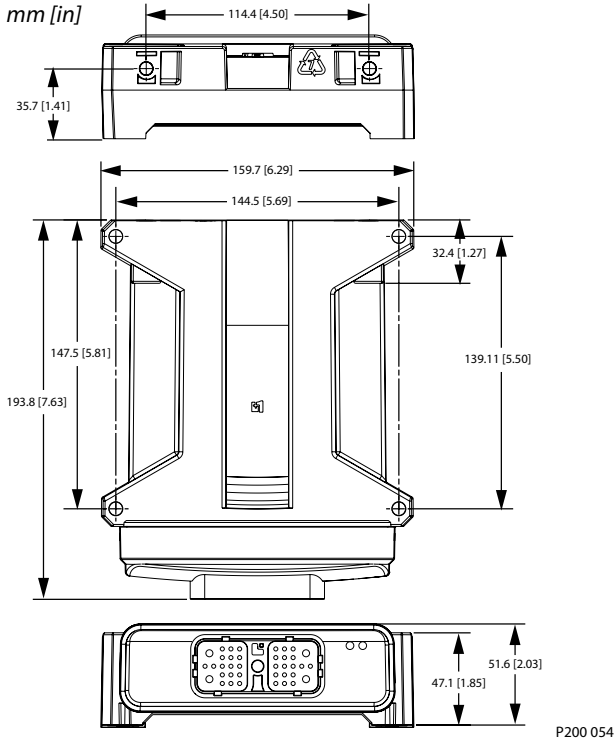
Application Development

Users develop MC038-020 applications with PLUS+1 GUIDE. This Microsoft[®] Windows[®] based development environment features a user-friendly, field proven, icon-based graphical programming tool, application downloader, and service/diagnostic tool.

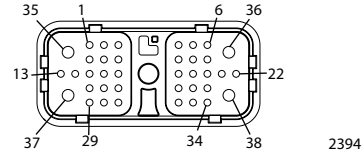
Features

- User-programmable with PLUS+1 GUIDE (Graphical User Integrated Development Environment)
- Power saving sleep mode functionality
- 38 pins: 1 Deutsch[®] DRC26-38SA connector
- 32 bit fixed-point DSP running at 150 MHz
- 12 bit analog-to-digital converter
- 16 inputs
 - 1 DIN-NO (digital) E-Stop
 - 1 DIN-NC (digital) E-Stop
 - 1 DIN (digital) Sleep Mode enable/disable
 - 4 DIN (digital) configurable as pull up (5 Vdc), pull down (0 Vdc)
 - 8 DIN/AIN (digital/analog) that are user-defined as either:
 - Digital:* pull up (5 Vdc), pull down (0 Vdc) or pull to center (2.5 Vdc)
 - Analog:* 0 to 5.25 Vdc or 0 to 36 Vdc
 - 1 AIN/CAN shield (fixed range analog) 0 to 5.25 Vdc or CAN shield pin
- 5 outputs
 - 1 DOUT (3 A digital), configurable as source only
 - 1 DOUT (8 A digital), configurable as source only
 - 1 HDOUT (20 A digital), configurable as source only – redundant 2-stage output path with diagnostic current feedback
 - 2 HPWM (19 A proportional), configurable as source or sink. Both PWM outputs operate as open loop. The output is a constant voltage. Diagnostic current feedback is available
- Independent power supplies for for the HDOUT and HPWM outputs
- 1 CAN 2.0B port. The fixed range analog (AIN/ CAN Shield) pin may be configured as a shield pin
- 5 Vdc power supply for external sensors rated at 150 mA, monitored and regulated internally
- Two LEDs under application software control
- CE compliant

Dimensions and Pin Assignments



38 Pin Connector



Pin	Controller function	Pin	Controller function
C1-P1	System power ground -	C1-P20	HPWM2 (19 A—Must pair with C1-P21—Pwr = C1-P28, 34, 38)
C1-P2	System power supply +	C1-P21	HPWM2 (19 A—Must pair with C1-P20—Pwr = C1-P28, 34, 38)
C1-P3	CAN0 +	C1-P22	HDOOUT (3 A—Pwr = C1-P2, 36, 37)
C1-P4	CAN0 -	C1-P23	HDOOUT (20 A—Must pair with C1-P15, 29, 30—Pwr = C1-P2, 36, 37)
C1-P5	AIN/CAN shield	C1-P24	DIN (Sleep Mode Input)
C1-P6	DIN/AIN	C1-P25	DIN
C1-P7	HPWM1(19A—Must pair with C1-P14—Pwr = C1-P28, 34, 38)	C1-P26	ESTOPIN (Disables C1-P15, 23)
C1-P8	5 Vdc sensor power +	C1-P27	DIN/AIN
C1-P9	Sensor power ground -	C1-P28	HPWM power supply +
C1-P10	DIN	C1-P29	HDOOUT (20 A—Must pair with C1-P15, 23, 30—Pwr = C1-P2, 36, 37)
C1-P11	DIN	C1-P30	HDOOUT (20 A—Must pair with C1-P15, 23, 29—Pwr = C1P2, 36, 37)
C1-P12	DIN/AIN	C1-P31	DIN/AIN
C1-P13	DOU (8 A—Pwr = C1-P2, 36, 37)	C1-P32	DIN/AIN
C1-P14	HPWM1 (19 A—Must pair with C1-P7—Pwr = C1-P28,34,38)	C1-P33	DIN/AIN
C1-P15	DOU (20 A—Must pair with C1-P23, 29, 30—Pwr = C1P2, 36, 37)	C1-P34	HPWM power supply +
C1-P16	DIN/AIN	C1-P35	System power ground -
C1-P17	DIN	C1-P36	System power supply +
C1-P18	DIN/AIN	C1-P37	System power supply +
C1-P19	ESTOPIN	C1-P38	HPWM power supply +

This device is not field serviceable. Opening the device housing voids the warranty.

Each set of HPWM pins must be terminated at a common junction.

All four 20A HDOOUT pins must be terminated at a common junction.

Caution

PCB damage may occur. All device power supply + pins must be connected to battery +.

Specifications

Supply voltage, device	9 to 36 Vdc
Operating temperature, ambient	-40°C to 70°C (-40°F to 158°F)
Storage temperature	-40°C to 85°C (-40°F to 185°F)
Programming temperature	0°C to 70°C (32°F to 158°F)
IP rating (with mating connector attached)	IP 67
EMI/RFI rating	100 V/m
Weight	0.53 kg (1.16 lb)
Vibration	IEC 60068-2-64
Shock	IEC 60068-2-27 test Ea
Device maximum current, sourcing	70 A
Device maximum current, sinking	31 A
Maximum current, power pins: C1-P2, C1-P34	10 A per pin
C1-P36, C1-P37, C1-P38	25 A per pin

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Use care when wiring mating connector. Above pinouts are for device pins.

Ordering Information

MC038-020 part number	11093209
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Related product	Danfoss part numbers
CG150 CAN/USB gateway	10104136
Deutsch® mating connector bag assembly	11027919 (16 to 20 AWG)
PLUS+1 GUIDE single user license	10101000

Danfoss comprehensive technical information PLUS+1 Controller Family Technical Information, 520L0719 and MC038-020 Application Program Interface (API) Document are on line at: www.danfoss.com and/or embedded in product HWD file

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